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L3: Entry 2 of 2

File: DWPI

Oct 9, 1998

DERWENT-ACC-NO: 1998-600558

DERWENT-WEEK: 200304

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TITLE: Scan exposure method for semiconductor device manufacture - involves regulating oscillation frequency of laser source such that maximum frequency is obtained when scanning speed of mask and substrate becomes maximum

INVENTOR: HAGIWARA, S; OZAWA, K

## PATENT-ASSIGNEE:

ASSIGNEE	CODE
NIKON CORP	NIKR
HAGIWARA S	HAGII
OZAWA K	OZAWI

PRIORITY-DATA: 1997JP-0088907 (March 24, 1997), 1996JP-0221751 (August 5, 1996)

## PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<u>JP 10270345 A</u>	October 9, 1998		021	H01L021/027
KR 98080158 A	November 25, 1998		000	H01L021/027
US 20020196418 A1	December 26, 2002		000	G03B027/54

## APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 10270345A	March 24, 1997	1997JP-0088907	
KR 98080158A	March 12, 1998	1998KR-0008191	
US20020196418A1	August 5, 1997	1997US-0905966	Cont of
US20020196418A1	July 12, 1999	1999US-0351173	

INT-CL (IPC): G03 B 27/54; G03 F 7/20; H01 L 21/027

RELATED-ACC-NO: 1998-199203

ABSTRACTED-PUB-NO: JP 10270345A

## BASIC-ABSTRACT:

The method involves illuminating predefined domain of a mask (R) using a pulse laser source (16). The illuminated pattern of the mask is projected onto a substrate (W), using a projection unit (PL). The average pulse energy output from the laser source is measured. A specific relation connecting number of exposure pulses corresponding to set exposure is obtained, based on the measured average pulse energy. The oscillation frequency of the laser source is regulated by a controller (16d) such that scanning speed of mask and substrate becomes maximum corresponding to maximum

oscillation frequency of laser source.

USE - For LCD element, CCD, thin film magnetic head.

ADVANTAGE - Shortens exposure time irrespective of high and low sensitive exposure domains. Enables to maintain stable scanning, even when pulse energy of laser source varies.

CHOSEN-DRAWING: Dwg.1/11

TITLE-TERMS: SCAN EXPOSE METHOD SEMICONDUCTOR DEVICE MANUFACTURE REGULATE  
OSCILLATING FREQUENCY LASER SOURCE MAXIMUM FREQUENCY OBTAIN SCAN SPEED MASK  
SUBSTRATE MAXIMUM

DERWENT-CLASS: P82 P84 U11 U13 U14

EPI-CODES: U11-C04E1; U13-A02; U14-K01A5;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N1998-467948

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L1: Entry 2 of 2

File: DWPI

Aug 21, 1998

DERWENT-ACC-NO: 1998-512345  
DERWENT-WEEK: 199844  
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TITLE: Scanning type exposure system for photolithographic processing in semiconductor device manufacture - has control unit that controls frequency of pulse like light when optimum exposure value is below minimum exposure value corresponding to maximum speed of reticle and wafer stages

## PATENT-ASSIGNEE:

ASSIGNEE

CODE

NIKON CORP

NIKR

PRIORITY-DATA: 1997JP-0027812 (February 12, 1997)

## PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<u>JP 10223513 A</u>	August 21, 1998		010	H01L021/027

## APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 10223513A	February 12, 1997	1997JP-0027812	

INT-CL (IPC): G03 F 7/20; H01 L 21/027

ABSTRACTED-PUB-NO: JP 10223513A

## BASIC-ABSTRACT:

The system includes a light source (1) which outputs pulse like light. A pattern formed on a reticle (R) is transferred to a wafer (W) by scanning it with pulse like light. The reticle and wafer are mounted on respective movable stages (15,19). A frequency control unit controls the oscillation frequency of the light source. The minimum exposure value related to maximum speed of wafer and reticle stages is obtained corresponding to predetermined number of pulses. When the optimum exposure value is below the minimum exposure value an exposure control unit controls the frequency of the pulse like light via the frequency control unit.

USE - In CCD type image pick-up element, LCD element, thin film magnetic head manufacture.

ADVANTAGE - Prevents reduction in speed of wafer and reticle stages even when scanning light sensitive material with high sensitivity. Improves throughput of exposure process.

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: SCAN TYPE EXPOSE SYSTEM PHOTOLITHOGRAPHIC PROCESS SEMICONDUCTOR DEVICE  
MANUFACTURE CONTROL UNIT CONTROL FREQUENCY PULSE LIGHT OPTIMUM EXPOSE VALUE BELOW

MINIMUM EXPOSE VALUE CORRESPOND MAXIMUM SPEED RETICLE WAFER STAGE

DERWENT-CLASS: P84 U11 U13 U14 W04

EPI-CODES: U11-C04A6; U11-C04E1; U13-A02; U14-K01A5; W04-M01B5;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N1998-400055

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L3: Entry 1 of 2

File: JPAB

Oct 9, 1998

PUB-NO: JP410270345A  
DOCUMENT-IDENTIFIER: JP 10270345 A  
TITLE: SCANNING EXPOSURE METHOD AND APPARATUS

PUBN-DATE: October 9, 1998

## INVENTOR-INFORMATION:

NAME

COUNTRY

OZAWA, KEN

## ASSIGNEE-INFORMATION:

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NIKON CORP

APPL-NO: JP09088907

APPL-DATE: March 24, 1997

INT-CL (IPC): H01 L 21/027; G03 F 7/20; G03 F 7/20

## ABSTRACT:

PROBLEM TO BE SOLVED: To invariably perform exposure in the shortest time irrespective of set light exposure.

SOLUTION: In scanning exposure, the oscillation frequency of a pulsed laser light source 16 is controlled by a main control unit 50 according to the number of pulses per one point, which is determined by the relationship between a set light exposure and a measured average pulse energy, so that at least one of the maximum scanning rate of a mask R and a sensitive substrate W and the maximum oscillation frequency of the light source 16 is maintained. Therefore, it is possible to perform scanning exposure at a maximum scanning rate irrespective of a set light exposure in a high sensitive region wherein a set light exposure is small and an oscillation frequency is not needed to be so high. On the other hand, as a set light exposure increases, an oscillation frequency has to be increased correspondingly. However, since the oscillation frequency has the upper limit at its maximum value, exposure is performed by setting the oscillation frequency at the maximum value in a low sensitive region wherein a set light exposure is large and the maximum scanning rate cannot be maintained.

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